



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,552	10/29/2002	Shigeru Sawada	39.002-AG	7687
29453	7590	05/17/2005	EXAMINER	
JUDGE PATENT FIRM RIVIERE SHUKUGAWA 3RD FL. 3-1 WAKAMATSU-CHO NISHINOMIYA-SHI, HYOGO, 662-0035 JAPAN			LOUIE, WAI SING	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding..

Office Action Summary	Application No.	Applicant(s)	
	10/065,552	SAWADA ET AL.	
	Examiner	Art Unit	
	Wai-Sing Louie	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 3,803,489) in view of Murakami et al. (US 6,501,101).

With regard to claims 1 and 4, Miller discloses a method of determining the doping (carrier concentration) profile in a semiconductor wafer (col. 3, line 38 to col. 7, line 3 and fig. 3) using "C-V technique" (col. 1, lines 18-23), where the carrier concentration profiling method includes:

- Contacting a liquid electrode 31 superficially on the wafer 11b (col. 4, lines 34-36 and fig. 2);
- Employing an applied voltage above 4 V to profile the wafer's C/V characteristic (col. 5, lines 54-26 and fig. 4). Although Miller does not disclose an applied voltages including at least a maximum voltage that surpasses 10 V. However, the curve 37 (liquid electrode) extends more than 10 volt. Since the applicant has not established the criticality of the maximum voltage stated and since these voltages are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device. Where patentability is

said to be based upon particular chosen dimension or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical.

In re Woodruff, 919 F2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990);

- Miller teaches the C/V technique could test the doping concentration on a silicon semiconductor wafer having a GaAs or GaP structure (col. 6, line 13-16), but do not disclose the wafer having a plurality of In-containing compound semiconductor layers. However, Murakami et al. disclose a silicon wafer having a multi-quantum well of AlInGaP compound semiconductor (Murakami col. 4, lines 1-3). Therefore, it would have been obvious for one with ordinary skill in the art to test the doping concentration on any silicon semiconductor wafer having a multi-quantum well of AlInGaP compound semiconductor as disclosed in Murakami.

Claims 2-3, 5-6, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 3,803,489) in view of Murakami et al. (US 6,501,101) as applied to claim 1 above, and further in view of Endredi et al. (US 5,237,266).

With regard to claims 2-3, Miller modified by Murakami et al. does not disclose the liquid electrode is an aqueous EDTA solution contains 80% or more. However, Endredi et al. disclose measuring the concentration of carrier in the semiconductor using "C-V technique" (Endredi col. 1, lines 17-20 and lines 38-42) and the liquid contact is EDTA solution (Endredi col. 8, lines 50-61). Endredi et al. teach the EDTA liquid electrode measurement is more accurate and reliable (Endredi col. 9, lines 13-21). Miller and Endredi et al. have substantially

Art Unit: 2814

the same environment of measuring the carrier concentration profile using the “C-V technique”. Therefore, it would have been obvious for the one with ordinary skill in the art to modify Miller’s device with the teaching of Endredi et al. to provide the EDTA solution as liquid electrode in order to have an accurate and reliable measurement.

Endredi et al. disclose the EDTA solution is a 0.1 molecular solution, but do not disclose an aqueous EDTA solution contains 80% or more. Since the applicant has not established the criticality of the concentration of EDTA solution stated and since the different of concentrations are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device. Where patentability is said to be based upon particular chosen dimension or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

With regard to claim 5, Miller modified by Endredi et al. in claim 2 above disclose using EDTA solution as liquid electrode to measure the carrier concentration profile in a n-type GaAs material semiconductor (Endredi col. 8, line 51), but do not disclose the EDTA solution is for melting Ga metal. Although Endredi et al. do not explicitly state that the EDTA solution is melting Ga metal. The prior art EDTA solution functions as a solvent. Statements of intended use do not structurally distinguish claims over prior art, which can function in the same manner, be labeled in the same manner, or be used in the same manner. See in *re Pearson*, *Ex parte Minks*, and In *re Swinehart*.

With regard to claims 6 and 14, in addition to the limitations disclosed in claim 1, Miller modified by Endredi et al. also disclose:

- EDTA solution melting the Ga metal and solidifying to form a metal Ga electrode (see claim 5 on same materials function the same as claimed);
- Subsequently to profile the carrier concentration via the solidifying Ga electrode (Endredi col. 9, lines 13-20);
- Placing the wafer 11c on an opening in the cell so as to put the liquid 31c in superficial contact with the wafer 11c to allow the liquid 31c to function as an electrode (col. 6, lines 22-67 and fig. 5).

Response to Arguments

Applicant's arguments filed 3/3/05 have been fully considered but they are not persuasive.

- Applicant argues that Miller does not disclose the wafer in superficial contact with the liquid electrode on a semiconductor material to be profiled. However, Miller clearly discloses the wafer 11c is in contact with the contact electrode 40, which is submerged within the electrolyte 31c (col. 6, lines 30-33) and a thin film of electrolyte 31c is sandwiched between the conductors 40 and the wafer 11c (col. 6, lines 34-36 and fig. 5). Therefore, the wafer is in superficial contact with the liquid electrode.
- Applicant argues that Miller does not teach or suggest "a plurality of layers In-containing semiconductor compound". However, Miller modified by Murakami et

al. would disclose "a plurality of layers In-containing semiconductor compound".

Please see the rejection above.

Conclusion

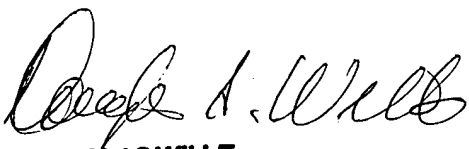
THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


DOUGLAS WILLE
PRIMARY EXAMINER


Wsl
May 12, 2005.